

**AMENDMENTS TO THE CLAIMS**

1-67. (Cancelled).

68. **(Withdrawn)** A *Helicobacter pylori* binding substance comprising terminal oligosaccharide sequence



wherein  $q1$ ,  $q2$ ,  $r1$ ,  $r2$ ,  $r3$ , and  $s$  are each independently 0 or 1 so that at least  $r2$  or  $q2$  is 1;

Hex1 is galactose (Gal), glucose (Glc) or Mannose (Man);

and analogs or derivatives of said oligosaccharide sequence having binding activity to *Helicobacter pylori* for the prophylaxis or treatment of any condition due to the presence of *Helicobacter pylori* in a subject.

69. **(Withdrawn)** The *Helicobacter pylori* binding substance according to claim 68 further comprising  $\beta 6\text{Hex3(NAc)}_{r5}$  or  $\beta 3\text{Hex3(NAc)}_{r5}$  structure in the reducing end of the oligosaccharide sequence forming the following structure



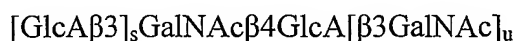
wherein  $q1$ ,  $q2$ ,  $r1$ ,  $r2$ ,  $r3$ ,  $s$  and Hex1 are as defined in claim 68,  $r4$  and  $r5$  are independently 0 or 1; Hex3 is mannose (Man), galactose (Gal) or glucose (Glc).

70. **(Withdrawn)** A *Helicobacter pylori* binding substance comprising oligosaccharide sequence



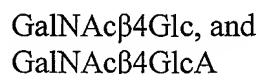
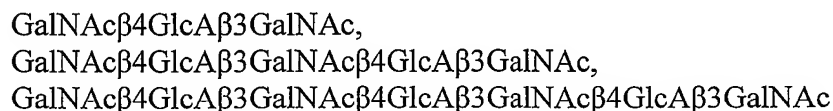
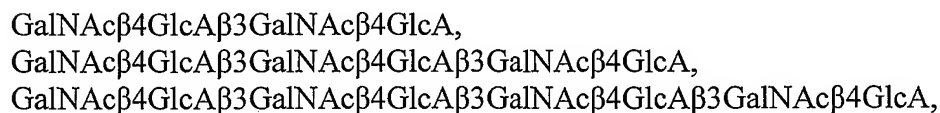
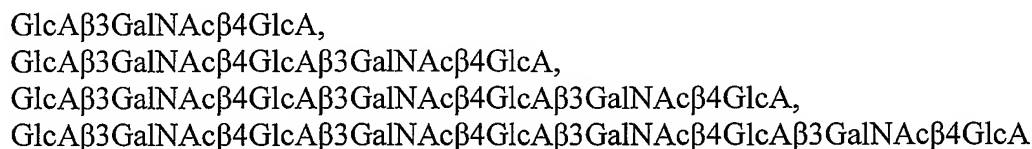
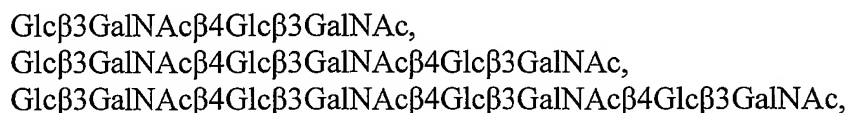
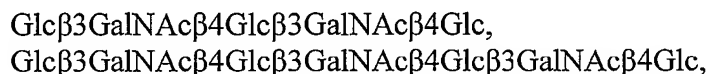
wherein q1, r1, and r3 are defined in claim 68, r5 and Hex3 are as defined in claim 69.

71. **(Withdrawn)** The *Helicobacter pylori* binding substance according to claim 68 wherein said oligosaccharide sequence is a natural type chondroitin sequence according to the following structure



wherein s and u are as defined above with the proviso that either s or u is 1.

72. **(Withdrawn)** A *Helicobacter pylori* binding substance comprising at least one terminal oligosaccharide sequence selected from the group consisting of:



73. **(Withdrawn)** Use of a *Helicobacter pylori* binding substance comprising terminal oligosaccharide sequence



wherein  $q1$ ,  $q2$ ,  $r1$ ,  $r2$ ,  $r3$ , and  $s$  are each independently 0 or 1 so that at least  $r2$  or  $q2$  is 1;

Hex1 is galactose (Gal), glucose (Glc) or mannose (Man);

and analogs or derivatives of said oligosaccharide sequence having binding activity to *Helicobacter pylori* for the production of a pharmaceutical composition for the treatment of any condition due to the infection of *Helicobacter pylori*.

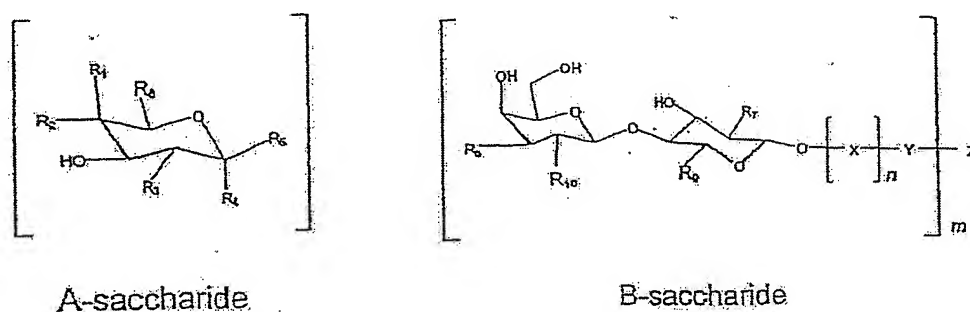
74. **(Withdrawn)** A pharmaceutical composition comprising the substance according to claim 68 for the treatment of any condition due to the presence of *Helicobacter pylori*.

75. **(Withdrawn)** The pharmaceutical composition according to claim 74 for the treatment of chronic superficial gastritis, gastric ulcer, duodenal ulcer, gastric adenocarcinoma, non-Hodgkin lymphoma in human stomach, liver disease, pancreatic disease, skin disease, heart disease, or autoimmune diseases including autoimmune gastritis and pernicious anaemia and non-steroid anti-inflammatory drug (NSAID) related gastric disease, or for prevention of sudden infant death syndrome.

76. **(Withdrawn)** A nutritional additive or composition containing the substance according to claim 68.

77. (Withdrawn) The substance accordingly to claim 68 for the use in *Helicobacter pylori* binding assays.

78. (Withdrawn) A *Helicobacter pylori* binding substance comprising an oligosaccharide sequence according to Formula 9



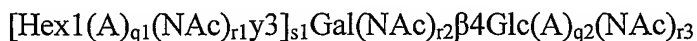
wherein integers 1, m, and n have values  $m = 1, 1$  and  $n$  are independently 0 or 1;  $R_1$  is H and  $R_2$  is OH, or  $R_1$  is OH and  $R_2$  is H, or  $R_1$  is H and  $R_2$  is a monosaccharidyl- or oligosaccharidyl- group, preferably a beta glycosidically linked galactosyl group,  $R_3$  is independently -OH or acetamido (-NHCOCH<sub>3</sub>) or an acetamido analogous group,  $R_7$  is acetamido (-NHCOCH<sub>3</sub>) or an acetamido analogous group; when  $l=1$ ,  $R_4$  is -H and  $R_5$  is oxygen linked to bond  $R_6$  and forms a beta anomeric glycosidic linkage to saccharide B, or  $R_5$  and -H and  $R_4$  is oxygen linked to bond  $R_6$  and forms an alpha anomeric glycosidic linkage to saccharide B; when  $l=0$ ,  $R_6$  is -OH linked to B; X is monosaccharide or oligosaccharide residue, X is lactosyl-, galactosyl-, poly-N-acetyl-lactosaminyl, or part of an O-glycan or an N-glycan oligosaccharide sequence; Y is a spacer group or a terminal conjugate such a ceramide lipid

moiety or a linkage to Z; Z is an oligovalent or polyvalent carrier; the oxygen linkage (-O-) between C1 or the B saccharide and saccharide residue X or spacer group Y can be replaced by carbon (-C-), nitrogen (-N-) or sulphur (-S-) linkage; R<sub>8</sub> and R<sub>9</sub> are independently carboxylic acid amide, such as methanamide or ethanamide, hydroxymethyl (-CH<sub>2</sub>-OH) or a carboxylic acid group or an ester thereof, such as methyl or ethyl ester; R<sub>3</sub>, R<sub>7</sub>, and R<sub>10</sub> are independently hydroxyl, acetamido or acetamido group mimicking group, such as C<sub>1-6</sub> alkyl-amides, arylamido, secondary amine, preferentially N-ethyl or N-methyl, O-acetyl, or O-alkyl for example O-ethyl or O-methyl.

79. **(Withdrawn)** A functional food comprising substances according to claim 68.

80. **(Withdrawn)** The functional food according to claim 79, wherein said food is selected from the group consisting of animal feed, infant formula and beverage.

81. **(Withdrawn)** Helicobacter pylori binding substance



wherein q<sub>1</sub>, q<sub>2</sub>, r<sub>1</sub>, r<sub>2</sub>, r<sub>3</sub>, and s<sub>1</sub>, are independently 0 or 1,

and Hex1, and Hex2 is a hexose structures, preferably galactose (Gal) or glucose (Glc), which may be further modified by the A and/or NAC groups, y is either alpha or beta indicating the anomeric structure of the terminal monosaccharide residue with the provisions that at least r<sub>2</sub> is 1 or q<sub>2</sub> is 1 and

that A indicates that glucuronamide when at least q<sub>1</sub> or q<sub>2</sub> is 1

or when s1 is 0, then

q2 is 1 and r2 is 0

or q2 and r2 and r3 are 1

or q2 and r2 are 1, r3 is 0 and A indicates a glucuronamide;

or when s is 1 then r2 is 1 then at least q1 is 1 or q2 is 1

with the provision that the molecule does not comprise two non-derivatized  $\beta$ -linked glucuronic acid units.

82. (**Currently Amended**) A method for the treatment or ~~prevention~~ inhibition of a condition due to or caused by the ~~present~~ presence of *Helicobacter pylori*, comprising administering to a subject in need of such treatment or inhibition wherein a pharmaceutically effective amount of the substance according to claim 68 or 72 is administered to a subject in need of such a treatment

(a) a *Helicobacter pylori* binding substance comprising terminal oligosaccharide sequence [Hex1 (A)<sub>q1</sub>(NAc)<sub>r1</sub> $\alpha$ / $\beta$ 3]<sub>s</sub>Gal(NAc)<sub>r2</sub> $\beta$ 4Glc(A)<sub>q2</sub>(NAc)<sub>r3</sub>

wherein q1, q2, r1, r2, r3, and s are each independently 0 or 1 so that at least r2 or q2 is 1;

Hex1 is galactose (Gal), glucose (Glc) or Mannose (Man),

and analogs or derivatives of said terminal oligosaccharide sequence having binding activity to *Helicobacter pylori* and comprising structures selected from the group consisting of: acetamido group mimicking group being another amide, amide derivatives from carboxylic acid group of the terminal uronic acid, or oligosaccharide structures having the same or similar conformations with said terminal oligosaccharide sequence, or

(b) a *Helicobacter pylori* binding substance comprising at least one terminal oligosaccharide sequence selected from the group consisting of:

Glc $\beta$ 3GalNAc $\beta$ 4Glc,

Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc,

Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc,

Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc,

Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc,

Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc,

GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,

GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,

GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,

GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA

GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,

GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,

GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,

GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc,

GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc,

GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc

GalNAc $\beta$ 4Glc, and

GalNAc $\beta$ 4GlcA.

83. (Previously Presented) The method according to claim 82, wherein said condition is selected from the group consisting of chronic superficial gastritis, gastric ulcer, duodenal ulcer, gastric adenocarcinoma, non-Hodgkin lymphoma in human stomach, liver disease, pancreatic disease, skin disease, heart disease, or autoimmune diseases including autoimmune gastritis and pernicious anaemia and non-steroid anti-inflammatory drug (NSAID) related gastric disease, and sudden infant death syndrome.

84. (Withdrawn – Currently Amended) Method A method of binding to *Helicobacter pylori* comprising ~~the steps of~~

~~contacting the substance according to claim 68 or 72~~

(a) a *Helicobacter pylori* binding substance comprising terminal oligosaccharide sequence [Hex1 (A)<sub>q1</sub>(NAc)<sub>r1</sub>α/β3]<sub>s</sub>Gal(NAc)<sub>r2</sub>β4Glc(A)<sub>q2</sub>(NAc)<sub>r3</sub>

wherein q1, q2, r1, r2, r3, and s are each independently 0 or 1 so that at least r2 or q2 is 1;

Hex1 is galactose (Gal), glucose (Glc) or Mannose (Man),

and analogs or derivatives of said terminal oligosaccharide sequence having binding activity to *Helicobacter pylori* and comprising structures selected from the group consisting of: acetamido group mimicking group being another amide, amide derivatives from carboxylic acid group of the terminal uronic acid, or oligosaccharide structures having the same or similar conformations with said terminal oligosaccharide sequence, or

(b) a *Helicobacter pylori* binding substance comprising at least one terminal oligosaccharide sequence selected from the group consisting of:

Glcβ3GalNAcβ4Glc,

Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc,  
Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc,  
Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc,  
Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc,  
Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc,  
GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,  
GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,  
GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,  
GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA  
GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,  
GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,  
GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,  
GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc,  
GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc,  
GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc  
GalNAc $\beta$ 4Glc, and  
GalNAc $\beta$ 4GlcA,

with a sample known to or suspected to contain *Helicobacter pylori* and detecting a complex or *Helicobacter pylori* and said substance.

85. (New) The method according to claim 82, wherein said analogs or derivatives of said terminal oligosaccharide sequences comprise structures selected from the group consisting of alkylamido, arylamido and secondary amine.

86. (New) The method according to claim 82, wherein said analogs or derivatives of said terminal oligosaccharide sequences comprise structures selected from the group consisting of N-ethyl, N-methyl, O-acetyl and O-alkyl.

87. (New) The method according to claim 82, wherein said analogs or derivatives of said terminal oligosaccharide sequences comprise structures selected from the group consisting of O-ethyl and O-methyl.

88. (New) The method according to claim 82, wherein said analogs or derivatives of said terminal oligosaccharide sequences are derivatized to one or several of the hydroxyl or acetamido groups of the oligosaccharide sequence.

89. (New) The method according to claim 82, wherein said method comprises administering (a) the *Helicobacter pylori* binding substance comprising terminal oligosaccharide sequence  $[\text{Hex1 (A)}_{q1}(\text{NAc})_{r1}\alpha/\beta 3]_s\text{Gal(NAc)}_{r2}\beta 4\text{Glc(A)}_{q2}(\text{NAc})_{r3}$

wherein  $q1$ ,  $q2$ ,  $r1$ ,  $r2$ ,  $r3$ , and  $s$  are each independently 0 or 1 so that at least  $r2$  or  $q2$  is 1;

Hex1 is galactose (Gal), glucose (Glc) or Mannose (Man).

90. (New) The method according to claim 82, wherein said method comprises administering (b) the *Helicobacter pylori* binding substance comprising at least one terminal oligosaccharide sequence selected from the group consisting of:

Glc $\beta$ 3GalNAc $\beta$ 4Glc,

Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc,

Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc,

Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc,

Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc,

Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc,

GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,

GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,

GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,

GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA

GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,

GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,

GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,

GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc,

GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc,

GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc

GalNAc $\beta$ 4Glc, and

GalNAc $\beta$ 4GlcA.

91. (New) The method according to claim 84, wherein said analogs or derivatives of said terminal oligosaccharide sequences comprise structures selected from the group consisting of alkylamido, arylamido and secondary amine.

92. (New) The method according to claim 84, wherein said analogs or derivatives of said terminal oligosaccharide sequences comprise structures selected from the group consisting of N-ethyl, N-methyl, O-acetyl and O-alkyl.

93. (New) The method according to claim 84, wherein said analogs or derivatives of said terminal oligosaccharide sequences comprise structures selected from the group consisting of O-ethyl and O-methyl.

94. (New) The method according to claim 84, wherein said analogs or derivatives of said terminal oligosaccharide sequences are derivatized to one or several of the hydroxyl or acetamido groups of the oligosaccharide sequence.

95. (New) The method according to claim 84, wherein said method comprises contacting (a) the *Helicobacter pylori* binding substance comprising terminal oligosaccharide sequence  $[\text{Hex1 (A)}_{q1}(\text{NAc})_{r1}\alpha/\beta 3]_s\text{Gal(NAc)}_{r2}\beta 4\text{Glc(A)}_{q2}(\text{NAc})_{r3}$

wherein  $q1$ ,  $q2$ ,  $r1$ ,  $r2$ ,  $r3$ , and  $s$  are each independently 0 or 1 so that at least  $r2$  or  $q2$  is 1;

Hex1 is galactose (Gal), glucose (Glc) or Mannose (Man).

with said sample known to or suspected to contain *Helicobacter pylori* and detecting said complex or *Helicobacter pylori* and said substance.

96. (New) The method according to claim 84, wherein said method comprises contacting (b) the *Helicobacter pylori* binding substance comprising at least one terminal oligosaccharide sequence selected from the group consisting of:

Glc $\beta$ 3GalNAc $\beta$ 4Glc,  
Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc,  
Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc,  
Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc,  
Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc,  
Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc $\beta$ 4Glc $\beta$ 3GalNAc,  
GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,  
GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,  
GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,  
GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA  
GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,  
GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,  
GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA,  
GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc,  
GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc,  
GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc $\beta$ 4GlcA $\beta$ 3GalNAc

GalNAc $\beta$ 4Glc, and

GalNAc $\beta$ 4GlcA.

with said sample known to or suspected to contain *Helicobacter pylori* and detecting said complex or *Helicobacter pylori* and said substance.

97. (New) The method according to claim 82, wherein said treatment is a prophylactic treatment.